

CLAIMS

1. A fuel cell comprising a solid electrolyte membrane, a fuel electrode and an oxidizer electrode with the solid electrolyte membrane between them, and a liquid fuel supply section for supplying liquid fuel to the fuel electrode, wherein:

the oxidizer electrode includes a base material and a catalyst layer formed between the base material and the solid electrolyte membrane; and

the base material includes therein a first layer having hydrophobic properties and a second layer having hydrophilic properties, which are arranged in this order in the direction from the catalyst layer side to the outside of the cell.

2. The fuel cell claimed in claim 1, wherein the base material is formed of porous conductive material.

3. The fuel cell claimed in claim 1 or 2, wherein the base material is formed of carbon paper or foam metal.

4. The fuel cell claimed in one of claims 1 to 3, wherein the first layer includes a water repellent resin.

5. The fuel cell claimed in claim 4, wherein the water repellent resin includes a fluorine-containing resin.

6. The fuel cell claimed in one of claims 1 to 5, wherein the second layer is formed by roughening the surface of the base material.

7. The fuel cell claimed in claim 6, wherein the second layer is formed by sandblasting the base material.

8. The fuel cell claimed in claim 6 or 7, wherein the second layer is formed by applying acid treatment to the base material.

9. The fuel cell claimed in one of claims 1 to 8, wherein the base material further includes therein a third layer having hydrophobic properties formed in the direction from the second layer toward the outside of the cell.

10. The fuel cell claimed in claim 9, wherein the third layer includes a water repellent resin.

11. The fuel cell claimed in claim 10, wherein the water repellent resin includes a fluorine-containing resin.

12. A fuel cell electrode for a liquid fuel supply type fuel cell comprising a base material and a catalyst layer formed on one surface of the base material, wherein the base material includes therein a first layer having hydrophobic properties and a second layer having hydrophilic properties, which are arranged in this order from the catalyst layer side in the direction away from the catalyst layer.

13. The fuel cell electrode claimed in claim 12, wherein the base material is formed of porous conductive material.

14. The fuel cell electrode claimed in claim 12 or 13, wherein the base material is formed of carbon paper or foam metal.

15. The fuel cell electrode claimed in one of claims 12 to 14, wherein the first layer includes a water repellent resin.

16. The fuel cell electrode claimed in claim 15, wherein the water repellent resin includes a fluorine-containing resin.

17. The fuel cell electrode claimed in one of claims 12 to 16, wherein the second layer is formed by roughening the surface of the base material.

18. The fuel cell electrode claimed in claim 17, wherein the second layer is formed by sandblasting the base material.

19. The fuel cell electrode claimed in claim 17 or 18, wherein the second layer is formed by applying acid treatment to the base material.

20. The fuel cell electrode claimed in one of claims 12 to 19, wherein the base material further includes therein a third layer having hydrophobic properties formed on the second layer in the direction away from the catalyst layer.

21. The fuel cell electrode claimed in claim 20, wherein the third layer includes a water repellent resin.

22. The fuel cell electrode claimed in claim 21, wherein the water repellent resin includes a fluorine-containing resin.

23. A method for manufacturing a fuel cell electrode for a liquid fuel supply type fuel cell, comprising the steps of:
forming a hydrophobic layer on one surface of a base material;
forming a hydrophilic layer on the other surface of the base material;
and
forming a catalyst layer by coating the surface of the hydrophobic

layer with paint containing conductive particles holding a catalyst material and particles including a solid polyelectrolyte.

24. The method for manufacturing a fuel cell electrode claimed in claim 23, wherein the step of forming the hydrophilic layer on the other surface of the base material involves surface roughening of the base material.

25. The method for manufacturing a fuel cell electrode claimed in claim 23 or 24, wherein the step of forming the hydrophilic layer on the other surface of the base material involves sandblasting.

26. The method for manufacturing a fuel cell electrode claimed in one of claims 23 or 25, wherein the step of forming the hydrophilic layer on the other surface of the base material involves acid treatment.

27. The method for manufacturing a fuel cell electrode claimed in one of claims 23 or 26, further comprising, after the step of forming the hydrophilic layer on the other surface of the base material, the step of forming the hydrophobic layer on the surface of the hydrophilic layer.

28. A method for manufacturing a liquid fuel supply type fuel cell comprising a fuel electrode and an oxidizer electrode, a solid electrolyte membrane placed between the fuel electrode and the oxidizer electrode, and a liquid fuel supply section for supplying liquid fuel to the fuel electrode, the method comprising the steps of:

forming the oxidizer electrode according to the method for manufacturing a fuel cell electrode claimed in one of claims 23 to 27; and

pressure-bonding the oxidizer electrode, the solid electrolyte membrane and the fuel electrode stacked in this order.